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# **The Impact of Insurance Literacy and Marketing Treatments on the Demand for Health Microinsurance in Senegal: A Randomized Evaluation**

SHORT RUNNING TITLE

## **Impact of Insurance Literacy and Marketing**

### **Abstract**

Mutual health organizations (MHOs) have been present in Senegal for years. Despite their benefits, in most areas take-up rates remain low. Using randomized controlled trials, we evaluate the effect of an insurance literacy module, communicating the benefits and functioning of health microinsurance, as well as three cross-cutting marketing treatments. The results from our various marketing treatments indicate a positive and significant effect on health insurance adoption, particularly for poor households, increasing take-up by around 35 - 40%. The insurance literacy module does not seem to have a positive impact on take-up decisions. We attempt to provide different contextual reasons for this result.

**KEYWORDS:** Community-based health insurance scheme, Randomized evaluation, Africa, Senegal.

**JEL classification:** O12, I13, I15

## 1 Introduction

In developing countries, the poor face high costs when accessing health care and need to insure themselves against health shocks. However, given that formal health insurance is prohibitively expensive, they must often, with proven success, use informal means of insuring themselves (see amongst many others, Fafchamps et al. 2003). However, the imperfect nature of this informal insurance entails severe consequences for their aptitudes in dealing with risk, smoothing their consumption and acquiring human capital (Gertler and Gruber, 2002). Indeed, health shocks lead to direct expenditures for medicine and treatment, which typically require out-of-pocket payments (OOP) and also entail indirect costs related to a reduction in productivity. One World Health Organisation (WHO) study (WHO, 2007) estimated that OOP payments regularly exceed 50% of total health care spending in some low-income countries (particularly for some African nations) where national health systems are still nascent at best and only a small proportion of the population own private health insurance.

Public health funding in Senegal has remained stable over recent years while overall per capita health expenditures have been increasing in the same period (World Bank, WDI). The lessening of the state's ability to meet health care needs has rendered it unable to provide universal insurance for the population. This has led to the emergence of many community-based health insurance schemes (CBHIS) in Senegal.<sup>1</sup> At the same time, the market has been ineffective in providing health insurance to low-income people, even in urban environments. Private insurers are often faced with significant adverse selection problems and high transaction costs, rendering their contracts prohibitively expensive to many. The poor can thus only resort to expedient transfers from relatives, self-insurance (selling assets, using precautionary savings, etc.) or health insurance schemes rooted in local organizations. The latter offer a form of insurance that allows members to pay regular affordable premiums to reduce OOP payments for healthcare upon falling ill. These schemes vary in design and implementation but are all not-for-profit organizations based on voluntary participation, underpinned by the concepts of mutual aid and social solidarity at the community level. In Senegal, CBHIS are known as '*mutuelles de santé*' or mutual health organizations (MHOs). The number of MHOs in Senegal has grown from just 13 in 1993 to more than 140 in 2007. The first law defining the juridical framework of MHOs was enacted in 2003 and a strategic plan for the development of MHOs (*Plan Stratégique de Développement des Mutuelles de Santé*) was initiated by the Minister of Health in 2004. Despite

<sup>1</sup> Health microinsurance programs have also emerged in India (Dror et al. 2007, Banerjee et al. 2014).

this growth, estimates from 2004 show that the take-up rate in the greater region of Thiès, the setting for this study, was close to a mere 5% (Smith et al., 2008).

The literature analysing the factors influencing demand for CBHIS, based on household data, has burgeoned in recent years; Jütting (2003), Dror et al. (2007), Smith et al. (2008) and Ito and Kono (2010) represent just a few such empirical studies in developing countries. Recent studies have used randomized controlled trials to look at the role of financial literacy and marketing on the uptake of rainfall insurance products (Cole et al., 2013; Gaurav et al., 2011).<sup>2</sup> The primary contribution of this paper is that it is one of just a handful to investigate the roles that such literacy and marketing dimensions have on the uptake of health microinsurance (see Thornton et al., 2010, for a study on voluntary health insurance programs in Nicaragua). In particular, we examine the roles played by a lack of knowledge of these MHOs and a lack of financial literacy amongst locals. We also investigate the effect of marketing treatments that alleviate liquidity constraints. Whilst we initially intended to track individuals for several months after the end of the experiment in order to investigate re-enrolment and welfare issues, logistical problems prevented us from doing so. As a result, the sole focus is on the question of microinsurance uptake.

We surveyed 360 randomly selected households across the city of Thiès, half of which were offered an insurance literacy training program. Independent of this assignment, all 360 households were randomly selected to receive one of three marketing treatments. These took the form of redeemable vouchers offering different levels of reduction in MHO entry costs. We find that our various marketing treatments have a positive and significant effect on health insurance adoption, increasing take-up by approximately 35 - 40% for the sample as a whole. After interacting the marketing treatments with income, this effect appears more pronounced for poorer households, confirming the importance of liquidity constraints as a barrier to health microinsurance take-up. Conversely, the insurance literacy module does not seem to have a positive impact on take-up decisions. We attempt to provide different contextual reasons for these results, which indicate that liquidity constraints and not lack of information hinder demand.

The next section elaborates on various reasons explaining low take-up rates in the context of our study. Section 3 presents the supply side of health microinsurance in Thiès. Section 4

<sup>2</sup> For a comprehensive review of the role of financial literacy in developed and developing countries see Lusardi and Mitchell (2014)

describes our experimental survey design and Section 5 presents descriptive statistics. Section 6 introduces our empirical strategy, followed by a discussion of our results in Section 7. Section 8 concludes.

## **2 Explaining low take-up rates**

Our sample of 360 household heads shows that 33% have health insurance of various forms, for all or a fraction of their household members (on average 73% of all household members). The largest share (19%) represents households that have health insurance compulsorily provided by their employer in both public and private sectors. Only 3% of the households subscribe to a private health insurer, while MHO membership appears relatively modest at 11%. The next section elaborates on each of these health insurance products. In our sample, the main justifications mentioned for non-membership were linked to the following: lack of information about the products offered and their existence (55%); liquidity constraints (16%); lack of interest (5%); and lack of trust and confidence (2%). Our investigation focuses on what appears to be the two most important reasons at play, in our context, in explaining low take-up rates.<sup>3</sup>

### **2.1 Lack of information**

Cai et al. (2009) highlight that many farmers in China refuse to purchase heavily subsidized insurance, partly due to the fact that some are unaware of the programs on offer. Jütting (2003), whose evidence is drawn from a rural region surrounding Thiès, notes that the concept of insurance is alien to a large proportion of people, suggesting that an information campaign might be useful in this respect. A related issue is the lack of knowledge and understanding of insurance principles (Chankova et al. 2008); referring to rainfall insurance in India, Giné et al. (2007) report that ‘the most common reason given by those interviewed was that they did not understand the product’. Limited understanding of rainfall insurance mechanisms in rural India is also highlighted by Cole et al. (2013), Gaurav et al. (2011) and Platteau and Ugarte Ontiveros (2013). Using a meta-analysis covering over 200 studies, Fernandes et al. (2014) find a limited impact of financial literacy interventions on financial behaviours, particularly in low-income samples.

### **2.2 Liquidity constraints**

<sup>3</sup> The literature on financial product take-up in developing countries also investigates the role of behavioural factors such as: loss aversion; aversion to contemplating adverse outcomes (Karlsson et al, 2009); prospect theory with narrow framing; limited attention (Karlan et al. 2010) and difficulties in evaluating low-probability events (Bbarseghyan et al. 2013).

Whether poor populations can afford microinsurance schemes is a crucial question. Jütting (2003) finds that the poorest are represented in MHOs to a lesser extent than those with an average or high income. Chankova et al. (2008) find similar results using data from Ghana, Mali and Senegal. Giné et al. (2008) also show that take-up rates of rainfall insurance increases with household wealth in rural Andhra Pradesh. Whilst only 16% of our sample mentioned liquidity constraints as the reason for non-membership, it is also likely that individuals were reluctant to admit lack of funds to justify the fact that they were not members. This figure may thus be biased downward.

### 2.3 Lack of Trust

Trust can also play an important role in individual decision-making with regards insurance. Cai et al (2009) show that the very low take-up by Chinese farmers of a government sponsored insurance for sows may be explained, among other reasons, by the lack of trust toward governmental institutions. Cole et al. (2013) show that endorsement from a third party makes people 40% more likely to purchase rainfall insurance.

Trust is likely to play an important role in both the sustainability of MHOs and their capacity to attract new members. Recent history in Thiès has shown that, in rare cases, some MHOs have ceased their activities or been temporarily unable to provide their members with insurance (Ferrera-Domingo (2002) lists some cases of defaulting MHOs). As claimed by Karlan (2005), answers on trust in General Social Surveys have predictive power on financial decisions such as repayment rates and saving patterns at the household level, and are a good proxy of the capacity to enter into binding relationships. A set of questions in our questionnaire were related to this issue; we asked individuals to weigh their trust on different items by putting aside marbles out of a maximum of ten on an increasing scale. Each answer was rescaled with regard to the trust given to the mother and the family respectively. For the sample of non-members who were aware of the existence of MHOs, we find that in both cases the median relative trust of MHOs given was eight out of ten. This suggests that these grassroots movements benefit from a largely positive *a priori* knowledge from locals and appear as trustworthy. This might explain why trust does not appear to be an important factor in explaining the low take-up rates observed.

## 3 The supply side

Health care in Thiès is organized according to a tiered system consisting of health huts (staffed by community health workers), health posts (staffed by nurses and certified midwives), and

health centres (staffed by medical doctors, nurses, and certified midwives). The health district of Thiès has one regional public hospital and one privately run mission hospital (*St-Jean de Dieu*). Data for this region shows that the ratio of inhabitants to health centres is seven times greater than WHO standards, but the ratio of inhabitants to health posts is in line with international norms (ANSD, 2008).

In the absence of universal public health care, only three forms of health insurance are present in our sample. The first, and of relatively little importance, is offered by private insurers. They provide insurance according to different scales and often require their clients to open a saving account within their own institution (PAMECAS, etc.). The second type refers to compulsory insurance provided by employers with a minimum number of employees. Employees contribute a fraction of their wage to their firms' health fund known as *Institution de Prévoyance Maladie* (IPM), which is then used for partial cover when health problems occur. Public servants have access to a more generous type of IPM where they, their spouse and often up to two children (under 18), are partially insured in case of health related expenditures. The third type consists of MHOs. Their appeal lies in the fact that they require the payment of affordable monthly premiums, mostly ranging from 200 to 500 CFA (0.30 to 0.76 Euro) per person covered.<sup>4</sup> MHOs are particularly attractive to the large numbers of self-employed and informal sector workers who have difficulty in accessing private insurance. Upon subscription, the household head pays a one time membership fee ranging from 1000 to 3000 CFA, which covers the registration cost. This includes receipt of a booklet listing all registered household members, which acts as an official document when visiting a health provider. The MHOs we surveyed did not operate any selection amongst potential candidates. The only screening involved takes the form of a 'period of observation', during which members are expected to pay individual premiums for three months, but are not entitled to make any claims. This three-month period is designed to minimise adverse selection by testing if new members can commit to a strict monthly schedule of contributions and prevents people from signing up for an MHO upon becoming sick. Any arrears on payments of premiums can lead to exclusion from coverage for that member. Whilst the rules are strict, the administrators of some MHOs have admitted to allowing a certain degree of flexibility. These not-for-profit grassroots schemes are managed by a non-remunerated governing body headed by a president and have written rules.

<sup>4</sup> Considering the average household size of 6.7 members, the household monthly premium should range from about 1340 to 3350 CFA. This corresponds to a negligible share of household income (0.6 to 1.5%). Taken together, entry fees and a three month observation period for the average household may range from 5000 to 13000 CFA, a share ranging from 2.2 to 5.8% of average monthly household income.

The various MHOs in the city are relatively well spread out across its territory; thus most neighbourhoods have access to one. There is no obligation to join the closest MHO. Indeed, one can opt for any MHO. For these reasons, we consider distance to the headquarters of the closest MHO as unlikely to have explanatory power over uptake. Once insured by one of the three schemes described above, members can directly access specified health facilities and are required to pay a fraction of the fees. The remainder of the fees are covered by the insurer. At their core, such transactions have agreements (or conventions) negotiated between each respective health provider (huts, posts or the two centres) and MHO operating in Thiès. As such the agreement of the insurer, prior to a consultation or the treatment of a particular patient, is not required. The array of interventions covered and the extent of the coverage varies from one MHO to the next. However, they generally cover 25-75% of consultation costs and between 50-100% of medical exams, hospitalizations, and various inpatient care fees at hospitals.

As IPMs do not offer full coverage for consultation or inpatient care and do not cover all members of a household, there is ample scope to complement this coverage with that of an MHO. 18% of all households exposed to the marketing treatment (21 out of 117) responded positively, even if they already had a form of health insurance. This suggests the intention to either complement existing means of insurance or to cover additional members of the household, kin or both. In particular, of the 21 households, seven complemented an IPM insurance, 11 an existing MHO insurance and three another private form of health insurance.

#### **4 Experimental design**

In early 2010 we developed a partnership with GRAIM (*Groupe recherche d'appui aux initiatives mutualistes*), a Senegalese NGO promoting the work of local MHOs active in greater Thiès. As such, GRAIM acts as a regional coordinator and the intermediary for most MHOs in negotiating conventions with health providers. This partnership enabled us to draw on its knowledge to design and deliver our educational modules. Thiès was chosen for two main reasons. Firstly, it is one of the largest cities in Senegal with a population of about 240,000 inhabitants. Secondly, some of the local MHOs are the oldest in Senegal, having been active for fifteen years; thus the city possesses a well-established supply of MHOs.

We use data collected during the spring of 2010 on 360 randomly selected households across the whole territory covered by the city authorities, which represents an area of approximately 20 square km. We sampled the number of surveyed households across all fifteen Thiès neighbourhoods according to their respective share of the overall population estimates (based



on the 2002 census). An official map of the city was used to select a number of streets spreading across each neighbourhood. Each street was assigned a number of households according to its length and density. For every street we used a pseudo-random process, by which every fifth lot according to a specific direction was picked. Since many households live on the same lot in semi-detached rooms, enumerators randomly selected one room by lot according to a clockwise selection varying from lot to lot. In the case where a lot was found empty or the head of household was not present, enumerators were instructed to set appointments and revisit the household later, otherwise the household was replaced.<sup>5</sup> Given the small number of households sampled from such a relatively large area, we argue that spillovers within the sample are unlikely.

Our baseline survey aimed to obtain information on individual and household characteristics, through a questionnaire administered to the household head, lasting about 40 minutes. No monetary compensation was offered for answering the questionnaire. We also gathered information from the household head concerning work, income, and a number of other factors which are described in greater detail below. In our context, and this can safely be extended to the broader national level, the husband is generally considered to be the breadwinner and the head of the house. As such, he is expected to provide insurance for the members of his household. This should provide ample justification as to why we collected these key variables affecting health insurance intake from the head. The data described and analysed below is thus at the household level.

Treatments were randomly assigned at the household level. Selected households in each neighbourhood were listed sequentially and assigned, through a random number generator, to receive one of the six sub-treatments we detail below. We proceeded this way in order to avoid imbalances between our treatments within neighbourhoods. At the end of our first visit and after completion of the baseline questionnaire, households selected for the information session were invited to attend an insurance literacy module. Our information session was held on a non-working day in the city centre, before our marketing treatment was implemented. Invitations were directly handed to heads of household. The module consisted of a three-hour educational presentation, offered by the GRAIM, on health microinsurance and specifically the functioning of MHOs (including the differences across various active MHOs in Thiès) and their origins in the region. A lesson on personal financial management which explored the notions of savings,

<sup>5</sup> Overall, 5 households did not want to participate in our study (1.4% of the targeted sample) and were replaced.

risk and insurance was also given. Case studies looking at health expenditures of different MHO members and non-member households were given in order to illustrate the different concepts introduced. Sessions were held in groups containing a maximum of 20 individuals at a time. GRAIM has been running a training program for several years for small communities eager to set up their own MHO and was therefore in an ideal position to run this module. It was slightly modified in order to be presented to randomly selected households. The same individual was in charge of running all the sessions, during which interactions with the participants were encouraged. Since the city covers a sizeable area, we reimbursed transportation costs for all individuals who had attended in order to minimize disincentives to attend. We gave 1000 CFA to every individual, which in Thiès, is the exact return fare for a taxi journey from any corner of the city to where the meetings were held.<sup>6</sup> Households were informed that transportation costs would be covered at the time of the invitation. Phone calls to household heads were made a day or two before, to remind them of the educational session. The comparison group of 180 households received nothing.

After the insurance literacy training was completed, all households were shortly revisited and received a marketing treatment in the form of one out of three vouchers. The assignment of vouchers was orthogonal to the invitation to the educational session. The 360 households were split into three randomly chosen subsamples (of 120 households each) with each receiving an additional marketing treatment in the form of one of three vouchers. So for the 180 households invited to attend the insurance literacy module, 60 received voucher 1, 60 voucher 2 and 60 voucher 3 (a similar distribution applies for the 180 households who did not receive an invitation to the module). Voucher 2 offered a full refund of membership fees in an MHO, which represented on average an amount of 1750 CFA (membership fees for the MHO joined by voucher holders ranged from 1000 to 3000 CFA). Voucher 3 provided a full refund of membership fees (equivalent to voucher 2) plus a refund of 250 CFA/month per new member covering fees linked to the observation period of three months (refunds were made for each new member for up to 3000 CFA, which is the equivalent of a three month premium for four people at 250 CFA/month). The refunds offered with vouchers 2 and 3 were such that respondents did not have to pay cash up front and then wait for a reimbursement. The vouchers actually reduced the initial cash outlay as these refunds were directly transferred to MHOs treasuries. Voucher

<sup>6</sup> We ensured, as much as we could, that the individuals who got their transportation reimbursed did actually pay for transport. We thus think that opportunism is unlikely to explain participation in the session (i.e. individuals attending just to obtain a little additional income).

1, a placebo treatment, had no monetary value attached, instead representing a simple invitation to the GRAIM in the event that the household was keen to know more about MHOs and the insurance products offered. The recipients of vouchers 2 and 3 had a period of two months to redeem the voucher by visiting the GRAIM and filling in an application form to join the MHO of their choice. Unfortunately, we could not collect information on how long households remained members following redemption of the voucher. Subscription is thus not measured in terms of how long they remained enrolled.<sup>7</sup> To ensure that our dependent variable was accurately constructed, we phoned all households who did not redeem their voucher one month after the redemption date to ask if, in the meantime, they had joined an MHO but not used their voucher.

## 5 Descriptive statistics

Table 1 reports summary statistics for the main socio-economic characteristics we consider in our study and which will be included in the empirical estimation below. The majority of household heads are male and live in a couple. The average household comprises over six members. 46% of heads attended secondary school or had higher levels of education (above six years of schooling). Household head's income represents the sum of all sources of monthly income (labour income or wage, rent and received transfers). Due to the sensitivity of questions related to income, and the reticence to provide exact amounts, answers were in most cases (68% of all answers) collected according to intervals. An aggregated measure of income was constructed by adding the midpoint values for the ten income intervals, or exact values when given, to rents and transfers. From this, the mean of monthly head of household income is 133591 CFA. We then categorized this variable into quintiles.<sup>8</sup> We also computed a synthetic measure of durable assets owned by the households as a proxy for wealth. This represents the sum of a list of items comprising, amongst others, a series of kitchen and home appliances, mobile phone, bicycle, motorcycle, car, sewing machine, different pieces of furniture, etc. As a proxy for income stability, we use a dummy identifying if the head of household is working for a public institution. We also include a dummy for self-employed individuals (the benchmark group are employed by private firms).<sup>9</sup> The intuition is that with respect to wages earned in

<sup>7</sup> This also means that we could not study the actual increase in access to and use of health services that MHO membership provided.

<sup>8</sup> Our results are robust to the use of an alternative variable, namely household's income. This was similarly computed by adding spouse's income (mean of 222340 CFA).

<sup>9</sup> Our results hold if we use a single dummy variable regrouping all formal sector employees, working in either the private or public sector.

informal activities (petty retailing, craftsmen, transport, etc.), public servants and formal employees of the private sector are likely to have a steadier stream of income and thus find it easier to commit to the payment of monthly premiums. Around 20% of heads in our sample work for the state. We also use dummy variables to measure if households were using one of three saving devices: ROSCAs, banks, or microfinance institutions. Access to a savings device might help a household to buffer health shocks by alleviating credit constraints, thus rendering MHOs less attractive. Alternatively, having access to savings may help households pay for membership fees and premiums, making MHO membership more feasible. Furthermore, being a member of a ROSCA might imply some discipline in saving which could in turn help an individual to commit to an MHO's premiums. With regard to the health status of the household, 67% of heads reported one of their household members having been sick in the previous twelve months. More sickness is likely to lead to greater demand for health care and hence for health insurance.<sup>10</sup> The mean of health-related monthly expenditure for a household is 8320 CFA, which represents around 3.7% of mean household income. We measure baseline knowledge of insurance and its basic concepts as a score given by the sum of correct answers to a series of seven true or false questions on the nature of insurance.<sup>11</sup> We then create two dummies for different levels of knowledge: Low insurance knowledge (score from 0 to 2) and high insurance knowledge (3 to 7).

INSERT TABLE 1 HERE

A set of questions in our questionnaire were related to trust, risk and time preferences. We asked individuals to weigh their trust on different items by setting aside marbles, out of a maximum of ten, on an increasing scale. Each answer was rescaled with regard to the trust given to the mother and the family respectively. For the sample of non-members who were aware of the existence of MHOs, we find that in both cases the median relative trust on MHOs given was eight out of ten. This tends to show that these grassroots movements benefit from a largely

<sup>10</sup> Some empirical studies focusing on developed countries show that advantageous selection into health insurance may arise as a consequence of higher preventive care (Fang et al, 2008). To the best of our knowledge, the majority of studies have not found such a phenomenon in developing contexts, where adverse selection appears to be a problem for health microinsurance programs (Wang et al., 2006; Spenkuch, 2012), although Banerjee et al. (2014) is a notable exception.

<sup>11</sup> The seven questions are: 1. Is the insurance premium reimbursed if one does not get sick? 2. Does the insurer make expenses just in case of sickness? 3. In case of sickness can one member consult a health provider at reduced prices, as the insurer covers part of the fees? 4. If insured, can one receive a payment in case of death? 5. Can the insurer help repaying any sorts of loans? 6. If I am not insured and I get sick, am I in charge of all healthcare expenditure relating to that illness? 7. If I have health insurance, do I start receiving money after one year?

positive *a priori* knowledge from locals and appear as trustworthy.<sup>12</sup> We measure risk preferences through a variable which takes a value of one if the household head is strongly risk averse (which is the case for 56% of them), i.e. always opted for the certain outcome when presented with a set of hypothetical choices between gambles and certain gains and losses, using a similar methodology as Voors et al. (2012). Each individual had to choose between certain outcomes (gain/loss of 200, 250 and 300 CFA) and simple gambles with probability 1/4 to win/lose 1000 CFA and probability 3/4 to win/lose nothing. We ran this exercise with the same amounts multiplied by a factor of ten. We also turned to the methodology put forward in Voors et al. (2012) to elicit discount factors. In this case, from a list of different hypothetical amounts to be received in one month, household heads had to choose the one that would make them indifferent from receiving 10000 CFA francs today. The list of amounts used in this question is as follows: 10500, 11000, 12500, 15000, 17500, 20000, 25000 and 30000 CFA, representing the following discount factors at one month: 5%, 10%, 25%, 50%, 75%, 100%, 150% and 200% respectively. We then generated a binary variable taking the value of one when the individual belonged to the more patient half of our sample.

Table 1 also shows univariate tests for random assignments of treatments across samples. Randomization with respect to voucher assignment appears satisfactory. However, a number of significant differences appear between treatment and control regarding invitation to the literacy module. Household heads that were not invited to the module are on average richer (a smaller proportion in the first quintile of income and larger proportion in the fourth quintile) and wealthier, according to the number of durables owned. Non-invited individuals also appear to be significantly more likely to be employed by a public institution and more knowledgeable about insurance and its basic concepts. Finally, the subsample of non-invitees is significantly better insured against health expenditures (through MHOs, IPMs, etc.). Even when we consider the large number of tests and use Bonferroni correction, *Already insured*, *Highest insurance knowledge*, *Durables* and *1st Income quintile* remain significantly different (at 10%) between treated and control across the invitation dimension. The reason that we observe these and the reason why our design gave those results is unclear to us. There was no difference in the refusal rate to participate in the study by treatment. To the best of our knowledge, none of our enumerators displayed strategic behaviour in selecting households and the assignment of

<sup>12</sup> Given that we have a measure of trust only for the subsample of non-members aware of the existence of MHOs we did not include this variable in our regression models. It would have significantly reduced the size of our sample for estimation.

treatments was conducted in a proper fashion that should have prevented this outcome. When turning to balance checks in a multivariate framework where treatment variables are regressed on all relevant observable characteristics (see Appendix A, Table A1; all our appendices are available online through the journal website), most of the imbalances registered in the univariate framework vanish. Some concerns remain though: the likelihood of being invited to the education session is significantly linked (at 10%) to being already insured and less wealthy (measured by the variable ‘durables’).

Table 2 decomposes uptake according to the educational and marketing treatments. One notices that our compliance rate for the educational treatment is relatively low; only 105 out of the 180 (58%) invited actually attended the module. It also shows that, for the subsample of households invited to the module, the difference in terms of uptake between those who attended the insurance literacy training and those who did not is negligible (24 versus 17). The table shows that voucher 1 had almost no impact on increasing uptake, with 89 out of 91 new uptakes being generated by either voucher 2 or 3. It is also interesting to note that 21 of the 91 who took insurance already possessed some health insurance (11 MHO, 7 IPM and 3 private insurers), indicating that MHO membership can complement current health insurance by covering additional members or by topping up existing insurance.

INSERT TABLE 2 HERE

## 6 Empirical specification

To assess the impact of our two different treatments we use the following model

$$Uptake_i = \alpha Invited_i + \delta 1 Voucher2_i + \delta 2 Voucher3_i + X_i' \beta + \varepsilon_i$$

where *Uptake* is a dummy variable taking the value one if the household subscribes to an MHO following one of our treatments. A household, indexed by the subscript *i*, subscribes if it redeems its voucher. To ensure that our dependent variable was accurately constructed, we phoned all households who did not redeem their voucher one month after the redemption date to ask if, in the meantime, they had joined an MHO but not used their voucher. This allowed us to account for the membership of two additional households. *Invited* is a dummy variable which equals one if the household was invited to the insurance literacy module. *Voucher 2 (3)* is a dummy variable equaling one if the household was given voucher 2 (or voucher 3). *X'* is a vector of other covariates including household heads' characteristics (gender, education, income, and employment status), an indicator of household wealth, two proxies for the status

of the household's health, the household's level of insurance literacy and risk and time preferences.

The coefficients of interest are  $\alpha$ ,  $\delta 1$  and  $\delta 2$ , which measure the effects on the probability of joining an MHO, of being invited to attend the educational module and of receiving either voucher 2 or voucher 3. In this context,  $\alpha$  measures the *intention-to-treat* effect in the reduced form. Because the compliance rate was not perfect (58% of people invited accepted the offer of insurance literacy training) we also estimate the average treatment effect of insurance literacy on the probability of take-up using IV in a structural model. Given that households self-select in attending the training session, it becomes necessary to correct for such a problem. Random assignment to the education module is used as an instrument for attending the module (first stage). The latter is then used to estimate the *treatment on the treated* effect (second stage). To investigate the role of liquidity constraints on health microinsurance take-up, we examine heterogeneous effects. In particular, we interact the marketing treatment variable (grouping both voucher 2 and 3) with income quintiles.

Given our small sample and the imbalance between treated and control groups across the 'Invited to the education session' dimension, we reweight the observations of our control subsample in order to perfectly balance covariate distributions in the treated and control groups along the first three sample moments (i.e. mean, variance and skewness), using entropy balancing (carried out using the 'ebalance' stata routine). A brief description and theoretical details of the procedure are supplied in Appendix A. Table A2 shows how the differences between treated and control groups disappear along the first three sample moments after applying this reweighting technique on all the variables used in our regressions. Regression tables 3 and 4 are presented after rebalancing has been carried out (Appendices B and C show the results without rebalancing). Both sets of tables show that none of the results, with regards the treatments, depend on reweighting the sample or multiple hypothesis testing.

## 7 Results and discussion

Columns 1 to 3 in Table 3 display the results of our ordinary least squares (OLS) model on the probability of take-up while columns 4 to 6 exhibit the same specifications estimated by 2SLS where presence at the education session is instrumented by being invited. It should be noted that the F statistics, used to identify the power of an instrument, deliver such high values that weak instruments do not to be an issue. Columns 1 and 4 keep the controls to a minimum, columns 2 and 5 add basic independent variables while columns 3 and 6 present results with



the full set of control variables. Results obtained (not shown) with a Probit model are similar. All regressions show that being either invited to or present at the educational module does not increase the likelihood of taking up microinsurance. They also clearly display that both vouchers significantly increase microinsurance uptake, by 38 and 48 percentage points respectively. This corresponds to a 216% increase with respect to the situation at the baseline. The coefficients of these variables are not significantly different from each other. The significant, positive and sizeable effect of our voucher treatments seem in line with the trend of the literature on formal insurance in developing countries, where take-up does not skyrocket even after generous subsidies. For example, Cole et al. (2013) find that even when an index insurance policy was so highly subsidized as to yield an expected return of up to 181%, only half of the households offered the policy purchased it. In Thornton et al. (2010), a sub-sample of households offered a 6-month health insurance subsidy, worth US\$96, were 33% more likely to enrol on the insurance program. Banerjee et al. (2014), found that bundling health microinsurance with microcredit led to a decrease in take-up.

INSERT TABLE 3 HERE

Neither the intention-to-treat (column 1 and 2) nor the treatment on the treated (column 4) effects of insurance literacy training are significant. This result is only slightly surprising given that only 55% of all 360 households noted a lack of information and knowledge was the reason they had not joined an MHO. Indeed, it could be that insurance literacy was already sufficiently high and that most people we invited to the training grasped the basic concepts and the need for health microinsurance. 51% of the heads randomly invited to attend the module had mentioned dearth of information as the reason explaining their lack of membership; only 58% of these actually attended. Several other reasons may explain the lack of a significant effect in our context. It could also be that the product offered by MHOs is simple enough to understand without the need for training. Gaurav et al. (2011) found that their educational module treatment on rainfall insurance in Gujarat in India improved uptake by just 8% and was thus not considered to be a cost-effective marketing tool. With data from the same country, Giné et al. (2007) emphasize the role of insurance literacy for rainfall insurance take-up. The complexity of rainfall insurance makes it more likely to benefit from an insurance literacy module. However this remains debatable, as Cole et al. (2013) find no significant effect (and surprisingly negative coefficients) of attending an educational module on rainfall insurance uptake in India.



The quality of the educational module could also have played a role. In this regard, we did not test participants' financial literacy after their exposure to the module and are thus unable to formally test the effect of this. However, we know that the person in charge of organizing the module had been running several dozen similar programs over recent years and was a senior member of staff at GRAIM. Moreover, our compliance rate was relatively low: only 58% of people invited turned up to the offer of insurance literacy training. We discuss this issue in greater detail below. For most households, the head attended the information sessions. However, even if (s)he is convinced by the benefits, this does not necessarily translate into membership as (s)he may have relatively little bargaining power within the household.

The lack of significance from the information treatment might also indicate that expectations about the product were overly optimistic and that once the details and fees were known, such insurance became clearly uninteresting or unaffordable. Such results can also be found in Thornton et al. (2010) who study a voluntary health insurance program for informal sector workers in Nicaragua, finding that a treatment involving the distribution of an informational brochure alone reduces the likelihood of enrolment in the insurance program by five percentage points relative to the control group which received nothing. Cole et al. (2011) offers financial subsidies among the unbanked in Indonesia, which significantly increased the share of households that opened a bank savings account within the subsequent 2 months. They also offer an orthogonal treatment providing a financial literacy module, which has no effect on the likelihood of opening a bank savings account for their overall sample. Another reason that could explain our result is the fact that around a quarter of the households invited, a non-negligible share, already had health insurance before attending.

It is worth mentioning that our computations show that our test for  $\alpha$  could detect expected effect size at the design phase (of 10-15%) with power well above the widely considered satisfactory threshold of 70%. For size effects comparable to the one we have for voucher 2, our power is above 95%. Tables D1 and D2 in Appendix D show that for both the coefficients of *invited to the education session* and *vouchers* our results offer convincing evidence to indicate that our sample size calculation was powered to detect statistically significant differences from the various groups.

Despite these results, we do not claim that information is of little importance if one wants to increase MHO membership and the uptake of health microinsurance. Information may be more likely to have a significant impact if it is targeted towards the neediest and in different contexts.

What we wish to highlight is that for the cost it represents, such informational sessions, at least in our context, appear to be less cost-effective in increasing uptake than voucher 2 (and 3). An invitation to the information module represents three types of costs: transportation costs of 1000 CFAF, a small fee for distributing the invitation (around 100 CFAF per household) and costs of about 500 CFAF per attendee to pay for the individual in charge of running the module, making an overall cost of 1600 CFAF per household. Voucher 2 costs on average 1750 CFAF for membership fees alongside some minimal fees for voucher distribution (around 100 CFAF per household), making an overall cost of around 1850 CFAF per household. When compared, the impact of voucher 2 is greater than twice the absolute value of the impact of the informational session for less than twice its cost. Given that the effects of voucher 2 and 3 are not statistically different, we can conclude that removing the entry fees to MHO subscription is the most cost-effective treatment among those considered.

We henceforth highlight other results of interest in Table 3.<sup>13</sup> Households whose heads have attended only primary school seem to be significantly less likely to join an MHO than those who have attended secondary school. Households from the first four income quintiles are significantly more likely to take-up MHO insurance than the richest households (the benchmark group is the richest quintile). This result is not in line with other related papers on the determinants of participation in MHOs (notably Jütting, 2003 and Jowett, 2003). The poorest do not appear to be excluded from subscribing to an MHO and the richest are likely to use other means to insure themselves (private insurer, own funds, etc.). This result is also consistent with the fact that liquidity constraints were only mentioned by 16% of the households surveyed in explaining lack of membership. However, whether a head of household is self-employed or works as a public servant, has no significant impact (the benchmark group is to be employed by a private firm). This appears to indicate that the stability of one's source of income is an irrelevant factor. Male headed households, as well as bigger households, are more likely to join MHOs. We also included a dummy variable *already insured* which takes the value one if the head has health insurance (IPM, MHO or private). Although, this variable appears to exhibit a negative sign in the two models presented, in most cases it is not statistically significant, with the exception of some of the regressions on the rebalanced sample where it is significant at the 10%.<sup>14</sup> This conveys that, conditional on the other factors, already being insured decreases the

<sup>13</sup> Given that we have a measure of trust only for the subsample of non-members aware of the existence of MHOs, we did not include this variable in our model. It would have significantly reduced the size of our sample for estimation.

<sup>14</sup> Our main results hold if we restrict the sample to those without insurance at the baseline.

likelihood of taking up microinsurance on average but also that enough individuals in this situation still join MHOs for the coefficient to be mostly insignificant. This reflects the discussion at the end of section 3. Indeed, most IPMs, MHOs and private insurers do not offer full coverage for consultation and inpatient care fees and do not cover all members of a household, leaving some scope to complement this coverage with that of an MHO. Other market imperfections such as credit constraints can contract poor households' demand for microinsurance. In this respect, we use the dummy *saving device* (taking the value one if the households are using one of three saving devices: ROSCAs, banks or microfinance institutions), which allows us to measure the impact of having access to financial institutions that can alleviate credit constraints on microinsurance uptake. Our results show that this variable has no significant impact. Neither does our proxy for wealth. These two results seem to indicate that credit constraints do not represent an important obstacle to uptake.<sup>15</sup> It is also interesting to note that, with respect to membership fees and monthly contributions, the vast majority of the groups that we encountered allowed their members some flexibility. Members can pay in delayed instalments, which may attenuate liquidity and credit constraints. Another noteworthy, and expected, result pertains to the highly significant and negative coefficient on the *No insurance knowledge* dummy (in the rebalanced sample), testifying that those who do not understand the principles of health insurance are less likely to join an MHO. Finally, in a region prone to various chronic and recurrent infections such as malaria, it was expected that households that contain unhealthy members would be more likely to join an MHO. However, the results indicate that households that reported recent episode of sickness (measured by the variable *reported sickness*, which takes the value one for a household where one of its members has suffered from any kind of sickness in the previous twelve months) were not more likely to join MHOs. This suggests that adverse selection is not likely to be an issue in the context of this study.

Neither the risk aversion nor the time preference variables appear to significantly influence uptake of our microinsurance product. This result is robust to different definitions of time and risk preferences. For risk preferences we consider the subsamples of risk-averse agents (always opting for the certain amount) for small and large stakes, for gains and losses. For time preferences we employ different time horizons and stakes, namely we elicit two days, two weeks, one month and six month discount factors for small (1000 CFA) and large (10000 CFA) stakes and construct a dummy taking the value of one when the individual belonged to the more

<sup>15</sup> Our sample shows that 33% of household heads tried to borrow from the formal sector in the past and the vast majority of them (94%) obtained the desired loan. Our data also show that it is the relatively richer households who attempted to get a loan. Nevertheless, it shows that, to a certain extent, credit is available in Thies.

patient half of our sample. The coefficients were not statistically significant in any combination of the time and risk variables.<sup>16</sup>

INSERT TABLE 4 HERE

Table 4 presents the results of heterogeneous effects, through interacted variable regressions. The first column presents the interaction between income quintiles and both voucher 2 and 3 combined (the variable *voucher* takes value one if an individual received either voucher 2 or 3). These results suggest that liquidity constraints are likely to be binding for the poorer and a barrier to health microinsurance take-up. While our marketing treatments are likely to constitute a negligible share of income for the richest households, therefore not impacting their take-up decision, they clearly matter for the poorest households' decision. When the educational module is interacted with the marketing treatment (*voucher*) and insurance knowledge we find no significant heterogeneous effect on the uptake, as confirmed by columns 2 and 3. The marginal effects of the interactions with the education session are never statistically significant and do not bring additional effects with regard to uptake.<sup>17</sup> Other regressions, not presented, interacting income and insurance knowledge corroborate the story that vouchers and income seem to drive most of the effect. Vouchers 2 and 3 combined have a strong and significant impact on microinsurance uptake, this effect being statistically significant for the poorest individuals in the sample. We also found that the marginal effects (not shown) of the interactions of the level of education (the dummies *head attended primary school* and *head attended secondary school or more*) with the education session are insignificant. It should also be noted that these results do not depend on the particular features of our randomization exercise, since our main results hold with and without rebalancing the control sample.

INSERT TABLE 5 HERE

Table 5 shows the determinants of attendance at the educational module. The independent variables include all control variables from table 4 except *voucher* which was distributed after the training was completed. As discussed above, only 105 of 180 invited households (58%) attended the educational module. This is despite the fact that invitations were directly handed

<sup>16</sup> Results are not shown, but are available upon request.

<sup>17</sup> Given the relatively large number of hypotheses we test, we also applied Bonferroni corrections to all our regressions. All results from Table 3 and most results from Table 4 (all those concerning voucher, and the first two quintiles of income) remain. Since Bonferroni corrections are known to be overly conservative, not taking account of the correlation between outcomes, we can prescribe a high level of confidence to our results.

to heads of household and we followed them up by calling to further advertise the module. The results suggest that two variables are consistently significant in explaining participation in the educational module, namely being among the poorest members of our sample (first income quintile) and owning durables. We find that the variables related to head's employment type, income, household's size and health status are insignificant. Insurance knowledge seems to be mostly insignificant in explaining attendance at the educational session, with the exception of the dummy regarding '*no insurance knowledge*' which is significant at the 10% level in one of four models.

We also examine the determinants of which MHO new subscribers decided to join. There seems to be no pattern between household characteristics, the voucher received (either 2 or 3) and whether or not they were invited to (attended) the education module, with the MHOs they decided to join in terms of membership fees, premiums and coverage. This partially comes from the fact that the MHOs selected are relatively similar. A discussion related to this issue is provided in Appendix E.

## **8 Conclusion**

We offered a customized insurance literacy module communicating the benefits arising from personal health insurance and explaining the functioning of MHOs to randomly selected households in the city of Thiès. We simultaneously measured the effect of three cross-cutting marketing treatments using a randomized controlled trial.

Our findings reveal that the insurance literacy module had no significant impact on health insurance take-up, while our marketing treatments have a large and positive significant impact on the households' purchase decisions, a result that holds in both the original and reweighted samples. What appears from various descriptive statistics and results from an econometric analysis, is that the key element driving new membership is the allocation of either voucher 2 or 3. This is particularly the case for the poorer households, who are more likely to be liquidity constrained. Crudely interpreted, these results suggest that what really matters is not education, but rather compensation in the form of reduced fees for membership and the period of observation. Should the state or the city authorities wish to increase take-up rates, the most efficient way would be to alleviate liquidity constraints and the financial barriers to entry by offering a subsidy akin to voucher 2. This voucher is significantly less costly than voucher 3, but shows a similar impact on uptake. If information is to be provided, it would have to be targeted and given more conveniently. We nevertheless remain cautious of such results by

emphasising that they are based on a relatively small sample. Unfortunately, our study does not touch upon the critical issue of membership sustainability over time once membership has been acquired.

MHOs could represent a unique way to reach relatively poor people and informal workers who do not have access to an IPM. The networks they represent in such districts should be considered a serious asset. Because they are well established and experienced institutions, there is potential to reach underprivileged households at a relatively low cost.

## References

ANSD. 2008. Situation Economique et Sociale de la Région de Thies. Available from [http://www.ansd.sn/publications\\_SES\\_region.html](http://www.ansd.sn/publications_SES_region.html)

Banerjee, A., Duflo, E. and Hornbeck, R. 2014. “Bundling health insurance and microfinance in India: There cannot be adverse selection if there is no demand”, *The American Economic Review* 104(5): 291–297.

Barseghyan, Levon, Francesca Molinari, Ted O'Donoghue, and Joshua C. Teitelbaum. 2013. "The Nature of Risk Preferences: Evidence from Insurance Choices." *American Economic Review*, 103(6): 2499-2529.

Cai, H., Chen, Y., Fang, H., and Zhou, L. 2009. “Microinsurance, Trust and Economic Development: Evidence from a Randomized Natural Field Experiment.” NBER Working Paper, 15396. National Bureau of Economic Research,

Chankova, Slavea, Sara Sulzbach, and François Diop. 2008. “Impact of Mutual Health Organizations: Evidence from West Africa.” *Health Policy and Planning* 23(4): 264–276.

Cole, Shawn, Xavier Giné, Jeremy Tobacman, et al. 2013. “Barriers to Household Risk Management: Evidence from India.” *American Economic Journal: Applied Economics* 5(1): 104–135.

Cole, Shawn, Thomas Sampson, and Bilal Zia. 2011. “Prices or Knowledge? What Drives Demand for Financial Services in Emerging Markets?” *The Journal of Finance* 66(6): 1933–1967.

Dercon, Stefan, Jan Willem Gunning, and Andrew Zeitlin. 2015 “The demand for insurance under limited trust: Evidence from a field experiment in Kenya”, mimeo

Dhaliwal, Iqbal, Esther Duflo, Rachel Glennerster, and Caitlin Tulloch. 2011. “Comparative Cost Effectiveness Analysis to Inform Policy in Developing Countries: A General Framework with Applications for Education. Mimeo Abdul LatifJameel Poverty Action Lab (J-PAL), MIT

Diop Francois P. 2005. “Determinants of Financial Stability of Mutual Health Organizations in the Thies Region of Senegal: Household Survey Component.” Bethesda, Abt Associates Inc.

Diop Francois P., Sulzbach Sara and Chankova Slavea 2006. “The Impact of Mutual Health Organizations on Social Inclusion, Access to Health Care, and Household Income Protection: Evidence from Ghana, Senegal, and Mali” Bethesda, Abt Associates Inc

Dror D, Radermacher R, Koren R, 2007. Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India. *Health Policy*, 82(1), 12–27.

Fafchamps, Marcel, and Susan Lund. 2003. “Risk-Sharing Networks in Rural Philippines.” *Journal of Development Economics* 71(2): 261–287.

Fang, Hanming, Michael P. Keane, and Dan Silverman. 2008. “Sources of Advantageous Selection: Evidence from the Medigap Insurance Market.” *Journal of Political Economy* 116(2): 303–350.

Fernandes Daniel, John G. Lynch Jr., Richard G. Netemeyer. "Financial Literacy, Financial Education, and Downstream Financial Behaviors." *Management Science*, Volume 60, Issue 8, January 27, 2014, pp. 1861 – 1883

Ferrera-Domingo Isabel. 2002. “Les Mutuelles de Santé de la Région de Diourbel et Thiès, Sénégal”. Infosure

Gaurav, Sarthak, Shawn Cole, and Jeremy Tobacman. 2011. “Marketing Complex Financial Products in Emerging Markets: Evidence from Rainfall Insurance in India.” *Journal of*



*Marketing Research* 48(SPL): S150–S162.

Gertler, Paul, and Jonathan Gruber. 2002. “Insuring Consumption Against Illness.” *American Economic Review* 92(1): 51–70.

Giné, Xavier, Robert Townsend, and James Vickery. 2007. “Statistical Analysis of Rainfall Insurance Payouts in Southern India.” *American Journal of Agricultural Economics* 89(5): 1248–1254.

Giné, Xavier, Robert Townsend, and James Vickery. 2008. “Patterns of Rainfall Insurance Participation in Rural India.” *The World Bank Economic Review* 22(3): 539–566.

Hainmueller, Jens. 2012. “Entropy Balancing for Causal Effects: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies.” *Political Analysis* 20(1): 25–46.

Hainmueller, Jens, and Yiqing Xu. 2013. “Ebalance: A Stata Package for Entropy Balancing.” *Journal of Statistical Software* 54(7).

Hirano, Keisuke, Guido W. Imbens, and Geert Ridder. 2003. “Efficient Estimation of Average Treatment Effects Using the Estimated Propensity Score.” *Econometrica* 71(4): 1161–1189.

Ito, Seiro, and Hisaki Kono. 2010. “Why Is the Take-up of Microinsurance so Low? Evidence from a Health Insurance Scheme in India.” *The Developing Economies* 48(1): 74–101.

Jowett, Matthew. 2003. “Do Informal Risk Sharing Networks Crowd out Public Voluntary Health Insurance? Evidence from Vietnam.” *Applied Economics* 35(10): 1153–1161.

Jutting, Johannes P. 2004. “Do Community-Based Health Insurance Schemes Improve Poor People’s Access to Health Care? Evidence From Rural Senegal.” *World Development* 32(2): 273–288.

Karlan, D., McConnell, M., Mullainathan, S., and Zinman, J. (2010). *Getting to the Top of Mind: How Reminders Increase Saving* (National Bureau of Economic Research, Inc).



Karlan, Dean S. 2005. "Using Experimental Economics to Measure Social Capital and Predict Financial Decisions." *American Economic Review* 95(5): 1688–1699.

Karlsson, Niklas, George Loewenstein, and Duane Seppi. 2009. "The ostrich effect: Selective attention to information." *Journal of Risk and Uncertainty* 38(2): 95-115.

Lusardi, Annamaria, and Olivia S. Mitchell. 2014. "The Economic Importance of Financial Literacy: Theory and Evidence." *Journal of Economic Literature*, 52(1): 5-44.

Platteau, Jean Philippe and Ugarte Ontiveros, Darwin 2013. "Understanding and Information Failures: Lessons from a Health Microinsurance Program in India," Working Papers 1301, University of Namur, Department of Economics.

Smith, Kimberly V, and Sara Sulzbach. 2008. "Community-Based Health Insurance and Access to Maternal Health Services: Evidence from Three West African Countries." *Social Science & Medicine* 66(12): 2460–2473.

Spenkuch, Jörg L. 2012. "Moral Hazard and Selection among the Poor: Evidence from a Randomized Experiment." *Journal of Health Economics* 31(1): 72–85.

Thornton, Rebecca L., Laurel E. Hatt, Erica M. Field, et al. 2010. "Social Security Health Insurance for the Informal Sector in Nicaragua: A Randomized Evaluation." *Health Economics* 19(S1): 181–206.

Voors, Maarten J, Eleonora E. M Nillesen, Philip Verwimp, et al. 2012. "Violent Conflict and Behavior: A Field Experiment in Burundi." *American Economic Review* 102(2): 941–964.

Wang, Hong, Licheng Zhang, Winnie Yip, and William Hsiao. 2006. "Adverse Selection in a Voluntary Rural Mutual Health Care Health Insurance Scheme in China." *Social Science & Medicine* 63(5): 1236–1245.

WHO. 2007. National Health Accounts. Geneva.

World Bank. World Development Indicators. Available from <http://data.worldbank.org/>

**Table 1** Random Assignment of Treatments, univariate tests

	Whole Sample		Not Invited		Invited		Difference	Voucher 1		Voucher 2		Voucher 3		F-test*
	Mean	s.d.	Mean	s.d.	Mean	s.d.		Mean	s.d.	Mean	s.d.	Mean	s.d.	
Head is male	0.733	0.443	0.75	0.434	0.717	0.452	0.033	0.758	0.43	0.7	0.46	0.748	0.436	0.51
Head lives in couple	0.817	0.387	0.844	0.363	0.789	0.409	0.056	0.792	0.408	0.825	0.382	0.84	0.368	0.65
Head attended primary school	0.2	0.401	0.2	0.401	0.2	0.401	0	0.166	0.374	0.215	0.412	0.218	0.415	0.62
Head attended sec. school or more	0.461	0.499	0.489	0.501	0.433	0.497	0.056	0.517	0.502	0.4	0.492	0.471	0.501	1.56
Household size	6.731	3.212	6.533	2.903	6.928	3.49	-0.394	7.1	3.46	6.35	3.143	6.748	3.009	1.61
Already insured	0.325	0.469	0.406	0.492	0.244	0.431	0.161**	0.358	0.482	0.3	0.46	0.319	0.468	0.43
No insurance knowledge	0.525	0.500	0.483	0.501	0.567	0.497	-0.083	0.475	0.04	0.57	0.079	0.529	0.079	1.1
Intermediate insurance knowledge	0.100	0.300	0.056	0.23	0.144	0.353	-0.089***	0.133	0.014	0.083	0.028	0.084	0.029	1.109
Highest insurance knowledge	0.375	0.485	0.461	0.5	0.289	0.455	0.172***	0.392	0.037	0.347	0.074	0.387	0.075	0.304
Head is public employed	0.197	0.398	0.233	0.424	0.161	0.369	0.072*	0.208	0.408	0.2	0.402	0.185	0.39	0.09
Head is self employed	0.428	0.495	0.433	0.497	0.422	0.495	0.011	0.425	0.496	0.413	0.494	0.445	0.499	0.13
Durables	6.597	3.109	7.078	3.262	6.117	2.878	0.961***	6 717	3 131	6 358	2 961	6 731	3 251	0.53
1st Income quintile	0.203	0.403	0.139	0.347	0.283	0.452	-0.144***	0.208	0.408	0.217	0.414	0.202	0.403	0.15
2nd Income quintile	0.247	0.432	0.244	0.431	0.239	0.428	0.006	0.233	0.425	0.242	0.43	0.244	0.431	0
3rd Income quintile	0.172	0.378	0.161	0.369	0.178	0.383	-0.017	0.142	0.35	0.167	0.374	0.202	0.403	0.67
4th Income quintile	0.178	0.383	0.222	0.417	0.133	0.341	0.089**	0.217	0.414	0.167	0.374	0.16	0.368	0.73
5th Income quintile	0.200	0.401	0.233	0.424	0.167	0.374	0.067	0.2	0.402	0.208	0.408	0.193	0.397	0.04
Saving device	0.569	0.496	0.617	0.488	0.522	0.501	0.094*	0.6	0.492	0.525	0.501	0.588	0.494	0.73
Reported sickness	0.669	0.471	0.7	0.46	0.639	0.482	0.061	0.675	0.47	0.658	0.476	0.681	0.468	0.07
Strongly risk averse	0.561	0.497	0.567	0.497	0.555	0.498	0.011	0.608	0.49	0.479	0.502	0.596	0.493	2.50*
Patient	0.414	0.493	0.383	0.487	0.444	0.498	-0.061	0.391	0.49	0.463	0.501	0.386	0.489	0.9
MHO take-up	0.253	0.435	0.227	0.42	0.277	0.449	-0.05	0.017	0.128	0.314	0.467	0.528	0.497	33.78***
N	360		180		180			120		121		119		

Notes: Column “Difference” reports the difference between Not Invited and Invited. Column “F-test” reports the values of a test of joint significance of the coefficients of a regression with the row variable as explanatory and dummies for vouchers as regressors; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 2** Uptake Distribution across Treatments

	N	Take-up (n)	Take-up rate % (n / N)	Take-up rate % (n / 360)
Already had some form of				
insurance	117	21	18	6
MHO members	37	11	30	3
IPM members	69	7	10	2
Private insurance	11	3	27	1
Educational treatment				
Invited to Educational Session	180	41	23	11
Attendants	105	24	23	7
of which already insured	27	6	22	2
Non-Attendants	74	17	23	5
of which already insured	17	4	24	1
Not Invited to Educational				
Session	180	50	28	14
of which already insured	73	11	15	3
Marketing treatments				
Voucher 1	120	2	2	1
of which already insured	43	0	0	0
Voucher 2	121	38	31	11
of which already insured	36	8	22	2
Voucher 3	119	51	43	14
of which already insured	38	13	34	4
Voucher 2+3	240	89	37	25
of which already insured	74	21	28	6
Whole Sample (#obs)	360	91	25	25

**Table 3** Determinants of Insurance Take-up (Rebalanced sample)

<i>Dependent variable = 1 if a household subscribes to an MHO</i>	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	IV	IV	IV
Invited to the education session	-0.0529 (0.0682)	-0.0529 (0.0563)	-0.0529 (0.0470)			
Present at the education session				-0.0907 (0.117)	-0.0907 (0.0936)	-0.0907 (0.0769)
Voucher 2	0.339*** (0.0752)	0.399*** (0.0643)	0.378*** (0.0560)	0.334*** (0.0726)	0.394*** (0.0619)	0.373*** (0.0534)
Voucher 3	0.413*** (0.0694)	0.478*** (0.0625)	0.482*** (0.0584)	0.411*** (0.0678)	0.476*** (0.0594)	0.480*** (0.0553)
1st income quintile		0.244*** (0.0796)	0.339*** (0.0880)		0.256*** (0.0801)	0.361*** (0.0888)
2nd income quintile		0.307*** (0.0799)	0.348*** (0.0849)		0.308*** (0.0777)	0.354*** (0.0821)
3rd income quintile		0.118 (0.0867)	0.187** (0.0824)		0.124 (0.0840)	0.197** (0.0779)
4th income quintile		0.189** (0.0814)	0.188** (0.0828)		0.188** (0.0785)	0.190** (0.0786)
Male		0.133* (0.0679)	0.145** (0.0645)		0.132** (0.0653)	0.145** (0.0612)
Age		-0.000381 (0.00200)	-0.000574 (0.00215)		-0.000439 (0.00194)	-0.000652 (0.00204)
Household size		0.0140* (0.00800)	0.0140* (0.00789)		0.0142* (0.00774)	0.0140* (0.00752)
Head attended primary school		-0.114 (0.0703)	-0.154** (0.0724)		-0.118* (0.0695)	-0.159** (0.0707)
Head attended secondary or more		0.0192 (0.0763)	-0.00658 (0.0742)		0.0152 (0.0733)	-0.0142 (0.0704)
Already insured			-0.120* (0.0728)			-0.114* (0.0691)
No knowledge of insurance			-0.247*** (0.0877)			-0.239*** (0.0841)
Highest knowledge of insurance			-0.0201 (0.101)			-0.0194 (0.0969)
Head has public employment			-0.0322 (0.0797)			-0.0319 (0.0754)
Head is self-employed			0.0252 (0.0550)			0.0209 (0.0523)
Durables			0.0148 (0.0115)			0.0168 (0.0109)
Savings device			0.0757 (0.0595)			0.0812 (0.0578)
Reported sickness over the year			-0.0679 (0.0588)			-0.0699 (0.0561)
Strongly risk averse			-0.00628 (0.0549)			-0.0102 (0.0527)
Impatient			-0.0475 (0.0569)			-0.0455 (0.0549)
Constant	0.0304 (0.0349)	-0.589*** (0.171)	-0.477 (0.299)	0.0327 (0.0378)	-0.579*** (0.166)	-0.498* (0.288)
F Stat				248.5 ***	227.6 ***	234 ***
Neighbourhood Fixed Effect	No	Yes	Yes	No	Yes	Yes
Observations	360	360	360	360	360	360
R-squared	0.174	0.332	0.408	0.166	0.326	0.402

Robust standard errors in parentheses, \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 4** Heterogeneous effects (Rebalanced sample)

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
Invited to the education session	-0.0205 (0.0449)	-0.0349 (0.0467)	-0.0543 (0.0604)	-0.0205 (0.0457)	-0.0191 (0.0540)	-0.0205 (0.0459)
Voucher	0.180** (0.0740)	0.375*** (0.0651)	0.385*** (0.0427)	0.370*** (0.0543)	0.386*** (0.0424)	0.399*** (0.0495)
1st income quintile * Voucher	0.221* (0.113)					
2nd income quintile * Voucher	0.361*** (0.105)					
3rd income quintile * Voucher	0.170 (0.131)					
4th income quintile * Voucher	0.155 (0.143)					
Invited to education session * Voucher		0.0217 (0.0796)				
Invited to the module * High insurance knowledge			0.0823 (0.107)			
Voucher * High insurance knowledge				0.0373 (0.0863)		
Invited to education session * Already insured					-0.00533 (0.110)	
Voucher * Already insured						-0.0610 (0.0882)
1st income quintile	0.112 (0.0843)	0.278*** (0.0794)	0.279*** (0.0799)	0.277*** (0.0799)	0.277*** (0.0802)	0.277*** (0.0801)
2nd income quintile	0.0677 (0.0726)	0.332*** (0.0775)	0.337*** (0.0769)	0.331*** (0.0777)	0.331*** (0.0781)	0.331*** (0.0782)
3rd income quintile	0.0838 (0.0879)	0.202*** (0.0763)	0.206*** (0.0763)	0.200*** (0.0761)	0.202*** (0.0771)	0.203*** (0.0765)
4th income quintile	0.0804 (0.0832)	0.199*** (0.0742)	0.196*** (0.0751)	0.198*** (0.0747)	0.199*** (0.0755)	0.200*** (0.0737)
Already insured	-0.0606 (0.0692)	-0.0540 (0.0717)	-0.0484 (0.0734)	-0.0542 (0.0714)	-0.0503 (0.0977)	-0.0115 (0.0706)
High insurance knowledge	0.137** (0.0618)	0.136** (0.0613)	0.0883 (0.0955)	0.111* (0.0606)	0.135** (0.0615)	0.136** (0.0611)
Controls + Neighbourhood Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	360	360	360	360	360	360
R-squared	0.327	0.313	0.315	0.313	0.313	0.314

Robust standard errors in parentheses, \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 5** Determinants of participation in the educational module

Dependent variable =1 if a household participated in the educational session	(1) OLS	(2) OLS	(3) Probit	(4) Probit
1st income quintile	0.331** (0.132)	0.366*** (0.136)	0.343*** (0.109)	0.409*** (0.110)
2nd income quintile	0.0848 (0.143)	0.0540 (0.143)	0.0986 (0.139)	0.0619 (0.152)
3rd income quintile	0.161 (0.136)	0.0750 (0.136)	0.176 (0.123)	0.0753 (0.141)
4th income quintile	0.0186 (0.145)	-0.0227 (0.153)	0.0300 (0.140)	-0.0134 (0.158)
Male	-0.0531 (0.0948)	0.0227 (0.0927)	-0.0594 (0.0983)	0.0491 (0.109)
Age	-0.00155 (0.00323)	-0.00287 (0.00351)	-0.00182 (0.00337)	-0.00352 (0.00376)
Household size	-0.000509 (0.0118)	0.000499 (0.0118)	0.000137 (0.0125)	0.00103 (0.0130)
Head attended primary school	-0.0270 (0.105)	-0.119 (0.109)	-0.0290 (0.111)	-0.159 (0.124)
Head attended secondary or more	-0.109 (0.107)	-0.168 (0.107)	-0.120 (0.111)	-0.228* (0.118)
Already insured	0.123 (0.112)	0.140 (0.113)	0.125 (0.113)	0.151 (0.115)
No knowledge of insurance	0.185 (0.114)	0.177 (0.119)	0.195* (0.117)	0.201 (0.126)
Highest knowledge of insurance	0.0843 (0.129)	0.0556 (0.133)	0.0833 (0.126)	0.0625 (0.136)
Head has public employment	-0.0238 (0.121)	0.0330 (0.122)	-0.0356 (0.126)	0.0234 (0.129)
Head is self-employed	-0.0387 (0.0889)	-0.0182 (0.0913)	-0.0461 (0.0922)	-0.0362 (0.101)
Durables	0.0324** (0.0143)	0.0409** (0.0167)	0.0375** (0.0167)	0.0510*** (0.0193)
Savings device	0.0763 (0.0829)	0.0492 (0.0878)	0.0925 (0.0881)	0.0831 (0.0964)
Reported sickness over the year	-0.0746 (0.0790)	-0.0582 (0.0868)	-0.0871 (0.0817)	-0.0703 (0.0926)
Strongly risk averse	-0.0402 (0.0754)	-0.0141 (0.0947)	-0.0499 (0.0788)	-0.0417 (0.100)
Impatient	0.0844 (0.0791)	0.0313 (0.0952)	0.0924 (0.0803)	0.0355 (0.0973)
Constant	0.457 (0.286)	0.330 (0.370)		
Neighbourhood Fixed Effect	No	Yes	No	Yes
Observations	180	180	180	177
(Pseudo) R-squared	0.121	0.204	0.097	0.164

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note that 3 observations are lost in column (4) due to one of the fixed effects explaining, conditionally on all covariates, perfectly the dependent variable.